



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Clinton A. Fruitman

RECEIVED

Serial No.: 09/008,148

JUL 12 1999

Filing Date: January 16, 1998

Group 3700

Title: METHOD AND APPARATUS FOR THE CHEMICAL
MECHANICAL PLANARIZATION OF ELECTRICAL DEVICES

APPELLANT'S BRIEF

PURSUANT TO 37 C.F.R. § 1.192

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APPENDIX A - Terminal Disclaimer in Accordance With 37 C.F.R. § 1.321(b)

JUL 06 1999

TRANSMITTAL OF APPEAL BRIEF (Large Entity)

RE-APPLICATION OF:

Clinton O. Fruitman

Serial No.	Filing Date	Examiner	Group
09/008,148	January 16, 1998	E. Morgan	372

Invention:

METHOD AND APPARATUS FOR THE CHEMICAL MECHANICAL
PLANARIZATION OF ELECTRONIC DEVICES

RECEIVED

JUL 12 1999

Group 3700

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

The fee for filing this Appeal Brief is: \$300.00

- A check in the amount of the fee is enclosed. NOTE:
two enclosed checks include \$300 filing fee
and \$280 for 2-month extension
- The Commissioner has already been authorized to charge fees in this application to a Deposit Account. A duplicate copy of this sheet is enclosed.
- The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. _____
- *A duplicate copy of this sheet is enclosed.


Signature

Dated: July 1, 1999

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I certify that this document and fee is being deposited on July 1, 1999 with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.


Signature of Person Mailing Correspondence

Joyce A. Simpson

Typed or Printed Name of Person Mailing Correspondence

cc:



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Appeal.
Brief
7/22/99

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Clinton O. Fruitman

Serial No.: 09/008,148

Filing Date: January 16, 1998

Title: METHOD AND APPARATUS FOR THE CHEMICAL
MECHANICAL PLANARIZATION OF ELECTRICAL DEVICES

TO: Assistant Commissioner for Patents
Washington, D.C. 20231

APPELLANT'S BRIEF
PURSUANT TO 37 C.F.R. § 1.192

Dear Assistant Commissioner:

Appellant appeals the decision of the Examiner finally rejecting all of the claims pending in the present application, namely claims 4-10. A Notice of Appeal was filed by Applicant on March 4, 1999 and this Notice of Appeal was indicated as being accepted by the United States Patent and Trademark Office on March 8, 1999. The period of response is hereby extended for filing this Brief by two months, until July 8, 1999.

I. REAL PARTY IN INTEREST

SpeedFam Corporation is the real party in interest in the subject application, by virtue of an Assignment from inventor Clinton O. Fruitman to SpeedFam Corporation (recorded on June 14, 1996 at Reel 8330, Frame 0122).

II. RELATED APPEALS AND INTERFERENCES

No other appeals or interferences are currently known that will directly affect, be directly affected by, or have a bearing on the decision to be rendered by the Board of Patent Appeals and Interferences in the present Appeal.

III. STATUS OF CLAIMS

Claims 4-10 are pending in the application.

Claims 4-10 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-13, 16-19, 1 and 2 of U.S. Patent No. 5,769,691 and under 35 U.S.C. § 103(a) and are appealed herein.

IV. STATUS OF AMENDMENTS

An amendment was filed after the Examiner's final Office Action amending claims 4, 5, 9 and 10. These amendments have been acted upon by the Examiner and denied entry by the Examiner as raising new issues which would require further search and consideration.

V. SUMMARY OF INVENTION

This invention discloses a method and apparatus for the chemical mechanical planarization of electronic devices which utilizes a non-cellular surface or pad in lieu of the traditional cellular polishing pad employed in presently known chemical mechanical planarization processes. (Specification at page 1, lines 10-13, and page 2, lines 21-23.) The flat or non-cellular pad dramatically reduces the number of stress concentration points over a given surface area of contact between the polishing pad and the workpiece being polished and may also have the effect of reducing the extent to which the pad bends over device topographies due to the lack of the cellular nap of the non-cellular pad. (Specification at page 2, lines 23-29.)

The material removal rate in the polishing process may be reduced due to the reduction in the number of stress concentration points per surface area at the polishing pad. Accordingly, the pressure between the polishing pad and the workpiece may be increased to compensate for this reduction in material removal rate. As a result, the use of the non-cellular polishing pad employed in the present invention effectively performs a lapping function on the workpiece whereby contact forces are distributed over a greater area for a given applied pressure, thereby achieving maximum flatness and planarity on the workpieces being polished. (Specification at page 2, lines 29-32, and

page 3, lines 1-7.)

The non-cellular lapping pad employed in accordance with the method and apparatus for chemically and mechanically planarizing the surface of a workpiece includes a substantially flat, non-cellular surface which contacts the workpiece. The non-cellular substantially flat surface comprises relatively few surface irregularities and is used in conjunction with suitable slurries that affect the chemical/mechanical polishing and planarization effects. (Specification at page 6, lines 12-18.) The lapping pad employed in the present invention preferably comprises a non-cellular pad that includes a substantially flat surface that is relatively pliable such that the undersurface of the pad can conform to the global topography of a workpiece. (Specification at page 6, lines 26-29.) The pad is preferably comprised of fused polyethylene, non-cellular urethanes, flexibilized epoxies, and the like. (Specification at page 6, lines 17-18 and lines 25-26.)

VI. ISSUES

The issues presented on appeal are:

1. Whether Appellant's Terminal Disclaimer complies with 37 C.F.R. § 1.32(b)(3).
2. Whether the prior art features or suggests all of the elements of Appellant's claims.
3. Whether the prior art suggests the desirability of combining the cited references to meet Appellant's claims in the manner proposed by the Examiner.
4. Whether the prior art suggests the desirability of modifying the cited references to meet Appellant's claims.
5. Whether the Examiner has established a *prima facie* case of obviousness by a preponderance of the evidence.

VII. GROUPING OF CLAIMS

The Examiner's group of claims containing claims 4-10 do not stand or fall together. More specifically, the following groups of claims are believed to be separately patentable:

In Group I, claims 4-8 stand together.

In Group II, claims 9-10 stand together.

In Group III, claim 5 stands alone.

In Group IV, claim 6 stands alone.

In Group V, claim 7 stands alone.

In Group VI, claim 8 stands alone.

In Group VII, claim 10 stands alone.

VIII. ARGUMENT

The Examiner rejected all of the pending claims 4-10 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-13, 16-19, 1 and 2 of U.S. Patent No. 5,769,691. In order to overcome this non-statutory double patenting ground of rejection, Appellant submitted a timely filed Terminal Disclaimer believed to be in compliance with 37 C.F.R. § 1.321(c). The Examiner has twice indicated that Appellant's Terminal Disclaimer does not satisfy 37 C.F.R. § 1.321(b)(3). Although the Examiner has not clearly stated why Appellant's Terminal Disclaimer fails to comply with 37 C.F.R. § 1.321(b)(3), and although Appellant believes Appellant's Terminal Disclaimer complies with 37 C.F.R. § 1.321(b)(3), Appellant is simultaneously submitting herewith, as Exhibit A, a replacement Terminal Disclaimer which clearly states that the Applicant is the sole and one hundred percent owner of the subject patent application.

The Examiner also rejected all of the pending claims as being unpatentable under 35 U.S.C. § 103(a) over Ronay (U.S. Patent No. 5,752,875) in view of Samuelson (U.S. Patent No. 4,048,765). To sustain this rejection, the Examiner must establish a *prima facie* case of obviousness. Furthermore, the Examiner must establish a *prima facie* case of obviousness by a preponderance of the evidence. The Examiner has not established a *prima facie* case of obviousness because, *inter alia*, (1) the prior art references, taken together, do not teach or suggest all of the elements of Appellant's claims; (2) there is no suggestion in the prior art to combine or modify references to meet Appellant's claims; and (3) combination of the prior art references does not result in Appellant's claims. Because the Examiner has not established obviousness by a preponderance of

the evidence, claims 4-10 are patentable over the Ronay reference in view of the Samuelson reference. Thus, Appellant respectfully requests that the rejection of these claims under 35 U.S.C. § 103(a) be withdrawn.

A. **The Examiner Has Not Established a *Prima Facie* Case of Obviousness**

The Examiner has the initial burden to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, the Examiner must establish that: (1) the prior art reference (or the references when combined) teaches or suggests all the elements of Appellant's claims; and (2) there is some suggestion, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine or modify the references. In the present case, with respect to Groups I and II, the Examiner has failed to establish that the Ronay and Samuelson references recite all of the claim elements including, *inter alia*, a non-cellular lapping surface made from a soft and pliable material that can conform to integrated circuit device layers formed on a workpiece. Moreover, there is no suggestion either in the Ronay or Samuelson references (or elsewhere in the prior art) to combine or modify the references to achieve Appellant's claims. Thus, the Examiner has failed to establish a *prima facie* case of obviousness for Groups I through VII.

1. **The Prior Art Does Not Teach or Suggest All of the Appellant's Claim Limitations**

To establish a *prima facie* case of obviousness, the Examiner must show that the combination of the prior art references teaches or suggests all of the elements of Appellant's claims. Some, but not all, of the elements of some of Appellant's claims are taught in the prior art. With reference to Appellant's claim 5, neither the Ronay or Samuelson patent references discloses a non-cellular lapping surface that is made from a soft and pliable material such that it conforms to integrated circuit device layers formed on a workpiece surface thereby resisting damage to the integrated circuit device layers. More particularly, while the Ronay patent reference discloses a polishing pad having

an open structure preferably comprised of napped poromeric synthetic such as polyurethane foam, and while the Samuelson patent reference discloses a non-cellular polyurethane polishing and finishing wheel for polishing and finishing metal parts, neither patent reference discloses a non-cellular lapping surface that is made from a soft and pliable material that conforms to integrated circuit device layers formed on a workpiece. Furthermore, since neither the Ronay or Samuelson patent reference discloses this element, neither the Ronay nor Samuelson patent reference discloses the method step of making a non-cellular lapping surface from a soft and pliable material that conforms to integrated circuit device layers formed on a workpiece as claimed in Appellant's claim 10. Thus, because the prior art references do not teach or suggest all of the Appellant's claim limitations, specifically a non-cellular lapping surface made of a soft and pliable material that conforms to integrated circuit device layers, the Examiner has not established that Groups III, IV, V, VI and VII are *prima facie* obvious.

2. The Prior Art Does Not Suggest Combining or Modifying Their Teachings to Achieve Appellant's Claims

To establish a *prima facie* case of obviousness, the Examiner must show either how the prior art references suggest, either expressly or impliedly, the combination that results in Appellant's claims or, alternatively, the Examiner must present a convincing line of reasoning as to why one skilled in the art would have found the claims to have been obvious in light of the teachings of the references. Ex parte Clapp, 227 U.S.P.Q. 972, 973 (Bd. of Pat. Appeals and Interferences, 1985). When the motivation to combine the teachings of the prior art references is not immediately apparent, it is the duty of the Examiner to explain why the combination of the teachings is proper. Ex parte Skinner, 2 U.S.P.Q.2d 1788 (Bd. of Pat. Appeals and Interferences, 1986). Significantly, the fact that references can be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination. In re Mills, 916 F.2d 680 (Fed. Cir., 1990).

The teaching or suggestion to make a claimed combination must be found in the prior art and

must not be based on Appellant's disclosure. In re Vaeck, 947 Fed.2d 488 (Fed. Cir., 1991). In the present case, the Examiner did not identify any express or implied suggestion in the references to combine the teachings because there is no such express or implied suggestion. Instead, the Examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the pad in Ronay with the non-cellular pad as taught by Samuelson in order to increase the heat distortion, decrease the friction, and prevent clogging and buildup thereby increasing pad life to 3-5 times that of other pads. (See paragraph 5 of the Examiner's Office Action dated July 9, 1998 and paragraph 6 of the Examiner's final Office Action dated January 5, 1999.)

It is well known in the art that lapping pads and polishing pads are distinctly different pads, and that the pads are not interchangeable or equivalent. Therefore, in that lapping pads and polishing pads serve different polishing functions, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the non-cellular pad in Samuelson with the pad in Ronay in order to increase heat distortion, decrease friction, and increase pad life by preventing clogging and buildup on the pads disclosed in Ronay. The test of obviousness is not whether features of a secondary reference may be bodily incorporated into a primary reference's structure, nor whether a claimed invention is expressly suggested in any one or all of the references. Instead, the test is what the combined teachings of references would have suggested to those of ordinary skill in the art. In re Keller, Terry, and Davies, 208 U.S.P.Q. 871, 881 (C.C.P.A., 1981). Accordingly, in that lapping pads and polishing pads serve different functions, it would not have been obvious to one of ordinary skill in the art to substitute the lapping pad disclosed in Samuelson for the polishing pad disclosed in Ronay.

Where it would not occur to one of ordinary skill in the art to perform a slight modification and achieve a new function, a device is patentable. In re Certan Steel Rod Treating Apparatus and Components Thereof, 215 U.S.P.Q. 237, 252 (U.S. Int'l. Trade Comm., 1981). In Appellant's case, incorporation of the non-cellular lapping pad disclosed in Samuelson within the chemical and mechanical polishing method disclosed in Ronay in order to achieve the function of polishing an electronic component, and specifically forming shapes in the soft metal layer comprising aluminum

on a dielectric layer, would not have occurred to one of ordinary skill in the art without Appellant's teachings. Instead, making such a substitution would lead one of ordinary skill in the art to believe that the electronic component would be damaged if polished using a lapping pad such as that disclosed in Samuelson.

The mere fact that the prior art may be modified to reflect features of the claimed invention does not make the modification, and hence the claimed invention, obvious unless the desirability of such a modification is suggested by the prior art. The claimed invention cannot be used as an instruction manual or "template" to piece together teachings of the prior art so that the claimed invention is rendered obvious. *In re Fritsch*, 23 U.S.P.Q.2d 1780, 1783-84 (C.A.F.C., 1992). Appellant's claims are directed to an apparatus and method for chemically and mechanically planarizing a surface of a workpiece using a non-cellular lapping surface, an abrasive slurry, and means for relatively moving the lapping surface and the workpiece so that the workpiece surface is contacted and planarized by the lapping surface while the abrasive slurry is disposed between the workpiece surface and the lapping surface. The only place that chemical and mechanical planarization of a workpiece with a non-cellular lapping surface and an abrasive slurry is taught is in Appellant's own patent application. Thus, the Examiner has used impermissible hindsight reconstruction in rejecting the claims, and has thus failed to prove that Groups I and II are *prima facie* obvious.

Further, in order to be relied upon as the basis for rejecting an applicant's invention, prior art references must either be in the field of applicant's endeavor or, if not, be reasonably pertinent to a particular problem with which the inventor was concerned. A combination of elements from non-analogous sources in a manner that reconstructs the applicant's invention only with the benefit of hindsight is insufficient to present a *prima facie* case of obviousness. *In re Oetiker*, 24 U.S.P.Q.2d 1443, 1445-46 (C.A.F.C., 1992). The Ronay patent reference is specifically applied to the art of chemical and mechanical polishing of electronic components on a semiconductor wafer. (See column 1, lines 12-16). In contrast, Samuelson specifically states that the method and apparatus of the invention are suitable for finishing workpieces formed of steel and other metals. (See column

4, lines 39-45; column 10, lines 45-56; column 11, lines 21-48; Fig. 6 and Figs. 10-14; and claims 1-6.) In addition, Samuelson specifically discloses that the polishing and finishing wheel described therein is well suited for use in O.D. grinders and centerless machines for finishing, lapping and honing operations.

Appellant's claims in Groups III, IV, V, VI and VII each require that the non-cellular lapping surface conform to integrated circuit device layers formed on the workpiece surface and resist damage to the integrated circuit device layers. The non-cellular lapping pad disclosed in Samuelson would not provide this function because the non-cellular lapping pad disclosed in Samuelson would, if able to perform the deburring, lapping and honing operations as suggested, be too abrasive and high in tensile strength to avoid damaging any microelectronic surfaces contained on the surface of a workpiece.

Clearly, the only teaching of the essential elements in Appellant's patent claims is in Appellant's own patent application, and it is well established that the Examiner may not use hindsight reconstruction after reviewing Appellant's patent application to support his proposed modification of the references. Thus, for all of the foregoing reasons, the Examiner has failed to carry his burden that Groups I-VII are *prima facie* obvious.

3. The Combination of the Prior Art References Does Not Result in Appellant's Claims

As further evidence that there is no suggestion to combine or modify the prior art references as proposed by the Examiner, if one skilled in the art combined the Samuelson reference with the Ronay reference, the final method and apparatus would not perform the intended function of Appellant's method and apparatus and would still not meet all of the elements of all of Appellant's claims. If, as suggested by the Examiner, one were to simply take the Samuelson non-cellular lapping pad and substitute it in place of the polishing pad in Ronay in order to increase the heat distortion, decrease the friction, and prevent clogging and buildup and therefore increase the lifetime of the pad, one would still not arrive at Appellant's claims in that the non-cellular lapping pad

disclosed in Samuelson would damage the integrated circuit device layers formed on the surface of a workpiece, and in that the Samuelson non-cellular lapping pad would fail to conform to integrated circuit device layers formed on the workpiece surface. In addition, if the non-cellular lapping pad disclosed in Samuelson, which is comprised of a polyurethane composition containing abrasive grains, were further combined with an abrasive slurry as required in all of Appellant's claims, the combination would not necessarily achieve one of the obvious reasons as indicated by the Examiner to combine the references, that reason being to prevent clogging and buildup on the pad surface. Thus, Groups I-VII of Appellant's claims are not obvious for the reason that the combination of the prior art references does not result in (i) including all of the elements of Appellant's claims, and (ii) the function deemed obvious by the Examiner for combining the two patent references.

B. The Examiner Has Not Established a *Prima Facie* Case of Obviousness by a Preponderance of the Evidence

As mentioned above, the Examiner has the initial burden of factually supporting a *prima facie* case of obviousness. This has not been done. Additionally, the Examiner must prove his case by a preponderance of the evidence, with due consideration to the persuasiveness of any arguments in rebuttal. In re Attacher, 977 F.2d 1443 (Fed. Cir., 1992). When the motivation to combine the teachings of the prior art references is not immediately apparent, it is the duty of the Examiner to explain why the combination of the teachings is proper. Ex parte Skinner, 2 U.S.P.Q.2d 1788 (Bd. of Pat. Appeals & Interferences, 1986). Moreover, the fact that references can be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination and/or modification. In re Mills, 916 F.2d 680 (Fed. Cir., 1990). Furthermore, the Examiner cannot suggest a combination or modification based on hindsight reconstruction.

As shown above, the Examiner has failed to meet his burden of persuasion. The Examiner did not identify any express or implied suggestion in either the Ronay or Samuelson references (or anywhere else) to combine or modify the references. Furthermore, although the Examiner stated

why she believed it would be obvious to one skilled in the art to substitute the pad in Ronay with the non-cellular pad taught by Samuelson, it was shown that the purpose for making such a substitution would not necessarily be achieved. For example, preventing clogging and buildup on the pad surface would not necessarily occur in that Appellant's patent claims require the use of a non-cellular lapping surface in combination with an abrasive slurry. In addition, whether or not the substitution of the non-cellular Samuelson pad in place of the Ronay pad would increase the heat distortion and decrease the friction remains unclear in that using the non-cellular lapping pad disclosed in Samuelson to achieve the function of polishing the surface of a workpiece such that the non-cellular lapping surface conforms to integrated circuit device layers on a workpiece could not occur since the non-cellular lapping pad in Samuelson would be too abrasive and high in tensile strength to achieve this function.

Therefore, the Examiner's implication that the non-cellular lapping pad disclosed in Samuelson could be seen to function in the same manner as envisioned by Appellant is incorrect and the Examiner therefore failed to provide a "convincing line of reasoning." Instead, the Examiner's suggestion of modification of the combined references resulted in quintessential hindsight reconstruction. Therefore, because the Examiner did not establish by a preponderance of the evidence a *prima facie* case of obviousness, Appellant respectfully submits that the associated rejection of the claims in Groups I-VII under 35 U.S.C. § 103(a) should be withdrawn.

C. Grouping of Dependent Claims

In addition to the foregoing discussion of Groups I and II, the following various groups of dependent claims are separately patentable for the following reasons:

With respect to Group III, claim 5 is patentable over Ronay in view of Samuelson because neither Ronay nor Samuelson disclose the use of a non-cellular lapping surface in the chemical and mechanical planarization of a workpiece which conforms to integrated circuit device layers formed on the workpiece, nor do these references disclose the use of a non-cellular lapping surface in the chemical and mechanical planarization of a workpiece which resists damage to integrated circuit

device layers contained on the workpiece. Ronay discloses polishing a wafer with a polyurethane pad and a slurry solution of silica. Samuelson teaches deburring, finishing, lapping and honing of pieces made of steel and other metals with a non-cellular pad. However, neither of these patent references suggests the combination or modification of these teachings to achieve the elements of claim 5, *inter alia*, an apparatus which includes a non-cellular lapping surface and an abrasive slurry to perform chemical and mechanical polishing of a workpiece where the non-cellular lapping surface conforms to integrated circuit device layers formed on the workpiece and resists damage to the integrated circuit device layers.

With respect to Group IV, claim 6 is patentable over Ronay in view of Samuelson because neither Ronay nor Samuelson discloses an apparatus for chemical and mechanical planarization of a workpiece which includes a non-cellular lapping surface made from fused polyethylene, flexibilized epoxy or a non-cellular urethane, and an abrasive slurry where the lapping surface conforms to integrated circuit device layers formed on the workpiece surface and resists damage to the integrated circuit device layers. Therefore, because the prior art references do not teach or suggest all of the elements of claim 6, Group IV is patentable.

With respect to Group V, claim 7 is patentable over Ronay in view of Samuelson because neither Ronay nor Samuelson disclose a specific slurry composition for use in an apparatus for chemically and mechanically planarizing a workpiece where the slurry composition is used in combination with a non-cellular lapping surface and the lapping surface conforms to integrated circuit device layers formed on the workpiece surface thereby resisting damage to the integrated circuit device layers.

With respect to Group VI, claim 8 is patentable over Ronay in view of Samuelson because neither Ronay nor Samuelson disclose an abrasive slurry comprising 11% by weight of a chemical agent having a particle size of about 30-80 nanometers, where the chemical agent is a hydroxide or potassium chloride, and a mechanical agent, selected from a group consisting of colloidal silica, cerium oxide and alumina in combination, used with a non-cellular lapping surface during chemical and mechanical planarization of a workpiece where the lapping surface conforms to integrated circuit

device layers formed on the workpiece thereby resisting damage to the integrated circuit device layers.

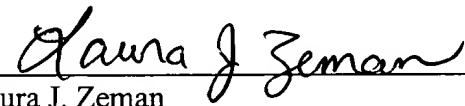
With respect to Group VII, claim 10 is patentable over Ronay in view of Samuelson because neither Ronay nor Samuelson disclose a method for chemical and mechanical planarization of a workpiece surface which includes movement between a non-cellular lapping surface and a workpiece surface in the presence of an abrasive slurry where the lapping surface conforms to integrated circuit device layers formed on the workpiece surface thereby resisting damage to the integrated circuit device layers.

IX. CONCLUSION

For the above reasons, claims 4-10 fully comply with 35 U.S.C. § 112 and are not obvious to one skilled in the art having knowledge of the Ronay and Samuelson references. Accordingly, Appellant respectfully submits that claims 4-10 are patentable over the prior art and respectfully requests this Board to so indicate.

Dated: July 1, 1999

Respectfully submitted,


Laura J. Zeman

Registration No. 36,078

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X. APPENDIX OF CLAIMS ON APPEAL

Claim 4. An apparatus for chemically and mechanically planarizing a surface of a workpiece comprising:

a non-cellular lapping surface;

workpiece mounting means for mounting said workpiece to expose said workpiece surface to said lapping surface;

an abrasive slurry disposed between said workpiece surface and said lapping surface; and

means for relatively moving said lapping surface and said workpiece mounting means such that said workpiece surface is contacted and planarized by said lapping surface.

Claim 5. An apparatus as claimed in claim 4, wherein said lapping surface is made from a soft and pliable material that conforms to integrated circuit device layers formed on said workpiece surface and resists damage to said integrated circuit device layers.

Claim 6. An apparatus as claimed in claim 5, wherein said lapping surface is made from fused polyethylene, flexibilized epoxy or non-cellular urethane.

Claim 7. An apparatus as claimed in claim 4, wherein said abrasive slurry comprises:

about 5-20% by weight of a chemical agent having a particle size of about 10-200 nanometers and being selected from a group consisting of a hydroxide and potassium fluoride; and

a mechanical agent selected from a group consisting of colloidal silica, cerium oxide and alumina.

Claim 8. An apparatus as claimed in claim 7, wherein said abrasive slurry comprises about 11% by weight of said chemical agent and said particle size is about 30-80 nanometers.

Claim 9. A method for chemically and mechanically planarizing a workpiece surface comprising the following steps:

providing a non-cellular lapping surface; and
effecting relative movement between said lapping surface and said workpiece surface in the presence of an abrasive slurry to planarize said workpiece surface.

Claim 10. A method as claimed in claim 9, and further comprising the step of making said lapping surface from a soft and pliable material that will conform to integrated circuit device layers formed on said workpiece surface and resist damage to said integrated circuit device layers.



EXHIBIT A

3rd Aug 99
F 17
Terminal Disclaimer
(N.E)

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

I hereby certify that the attached correspondence is being deposited as First Class Mail this date with the United States Postal Service in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231.

Dated: July 1, 1999

By:

Judge L. Simpson
Signature of Person Depositing in Mail

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
- PATENT APPLICATION -**

RECEIVED

Applicant: Clinton O. Fruitman

Docket No.: 29131.0217

Serial No.: 09/008,148

Art Unit: 3723

Filed: January 16, 1998

Examiner: E. Morgan

Group 3700

JUL 12 1999

Title: METHOD AND APPARATUS FOR THE
CHEMICAL MECHANICAL PLANARIZATION
OF ELECTRONIC DEVICES

**TERMINAL DISCLAIMER IN ACCORDANCE
WITH 37 C.F.R. § 1.321(b)**

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir or Madam:

SpeedFam Corporation is the sole owner of the instant application, the same as the owner of U.S. Patent No. 5,769,691 in that the instant application is a continuation of what is now known as U.S. Patent No. 5,769,691. U.S. Patent No. 5,769,691 was assigned to SpeedFam Corporation by way of a proper Assignment which was recorded in the United States Patent and Trademark Office at Reel 8330, Frame 0122. Accordingly, the owner of the instant application, SpeedFam Corporation, hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend it beyond the expiration date of

the full statutory term defined in 35 U.S.C. §§ 154-156 and 173, as presently shortened by any terminal disclaimer, of prior U.S. Patent No. 5,769,691. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend the expiration date of the full statutory term as defined in 35 U.S.C. §§ 154-156 and 173 of the prior patent, as presently shortened by any terminal disclaimer, in the event that it later expires for failure to pay maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. § 1.321, has all claims canceled by reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

As Applicant's attorney of record, I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,



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